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February 19, 1955

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Convertible plane

See page 118

A SCIENCE SERVICE PUBLICATION

AERONAUTICS

Convertiplane Unveiled

Cross between helicopter and conventional plane has two wingtip propellers that provide lift for take-off and thrust for forward flight.

See Front Cover

► A PLANE designed to take off like a helicopter and fly like a conventional plane, unveiled at Fort Worth, Texas, is the second in a series of three revolutionary "convertiplanes" being perfected for the Army.

The unique feature of the XV-3, developed by Bell Aircraft Corp., is its two large wing-tip propellers that perform the double function of lifting the plane from the ground vertically and pulling it to high speeds in level flight.

An earlier convertiplane, the XV-1, developed by McDonnell Aircraft Corp. in St. Louis and shown last February, has a large stationary helicopter rotor above the fuselage powered by small jet units at the tip of each blade. Another small "pusher" propeller mounted between the double tail assembly gives thrust for level flight. This model is now undergoing flight tests.

In the Bell XV-3 convertiplane, shown on the front cover of this week's *SCIENCE NEWS LETTER*, the props are mounted on streamlined knobs at the end of the craft's relatively short wings. These triple-bladed rotors spin horizontally on take-off, landing, low speed and hovering maneuvers, but tilt forward about 90 degrees for conventional flight at over 175 miles per hour. The plane is scheduled for flight tests in the spring. It should be able to operate out of rough, confined areas like the helicopter but have the additional advantage of longer range and far greater speed.

The props on the XV-3 will convert from rotor to propeller attitude in a gradual operation that takes 10 to 15 seconds. The transition will be smooth, without loss of altitude, and the change could be accomplished while the craft is in a steady climb. During the switch the load is transferred from the rotors to the wings.

The plane is 30 feet long and 13 feet high with a 30-foot wingspan. The props are powered by a single Pratt and Whitney engine behind the cockpit. A ski assembly is used as the landing gear.

The new model will carry four on reconnaissance missions, or a pilot, a medical attendant and litter space for two in evacuation and rescue operations.

The third company which was awarded a joint Army-Air Force contract in 1951 to develop a variation of the convertiplane principle is the Sikorsky Aircraft Division in Bridgeport, Conn. This model has not been completed. Its designs employ a new approach that is a military secret.

Commercially, convertiplanes are expected to make air transportation available to al-

most every city in the world, including those which cannot support an airport. It is expected, also, that convertiplanes might eventually find large scale use in short inter-city flights.

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ASTRONOMY

Gray Clouds, Flares Suggest Mars Volcanoes

► ORIGIN OF strange gray clouds billowing from the planet Mars and bright points of light on the Martian surface remain a mystery.

Sun-dogs in reverse might explain the intense flares, Dr. Dean B. McLaughlin of the University of Michigan has suggested in transmitting to *Sky and Telescope* (Feb.) observations of these strange events by Japanese scientists. Reflection of sunlight from ice crystals in the Martian atmosphere might cause the sun-dogs in reverse.

The ash-colored clouds seen in January and March, 1950, and in February and April, 1952, might result from volcanic activity, Tsuneco Saheki of Osaka Planetarium, Japan, reported. The brilliant flares were spotted in 1937, 1951 and 1954, he said.

Dr. McLaughlin (see *SNL*, July 3, 1954, p. 11) proposed that dark features of Mars may be wind-blown drifts of ash coming from volcanoes, not vegetation as has often been proposed. This would mean that conditions on Mars might correspond to an early stage in the earth's development, one in which oceans have yet to form and life to appear.

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ENTOMOLOGY

Half Young, Half Aged Insects Are Produced

► INSECTS THAT are half young and half aged have been produced by using carbon monoxide and beams of light in experiments being conducted to find out how humans grow and age.

Almost any part of an insect can now be made to grow and age, while the rest of the insect remains young, Dr. Howard A. Schneiderman of the zoology department at Cornell University in Ithaca, N.Y., found.

"If scientists could learn how growth is turned on and off," Dr. Schneiderman explained, "they would understand abnormal or malignant growth and aging."

In his investigations, the New York scien-

tist is using hundreds of giant *Cecropia* silkworms. Prof. Schneiderman pointed out that the chemical machinery responsible for cell growth of all organisms is fundamentally the same. He illustrated this by showing that many of the chemical processes underlying cell growth in potatoes, peas and oats are the same as in silkworms.

"Silkworms and most other insects," he reported, "produce two important hormones, a growth hormone and a juvenile hormone. The growth hormone causes the cells of the insect to increase in size and number, and the juvenile hormone prevents these cells from aging."

Dr. Schneiderman has been able to put growing insects or plants into a state of suspended animation with carbon monoxide. The poisonous effects of this gas were prevented by exposing the organisms to bright light.

In this manner, and by directing the light to a specific part of the insect, Dr. Schneiderman produced half young, half aged insects.

Within the past year, he stated, German scientists have succeeded in isolating the growth hormone and extracting 1/500th of an ounce of the hormone from two and a half tons of silkworms. Discovery of how these hormones operate, Prof. Schneiderman added, would mean a great step forward in understanding growth and aging.

The Cornell scientist has also found that silkworms in "diapause" or suspended animation are highly resistant to excessive oxygen as well as to damage caused by X-rays. A diapausing silkworm pupa, for example, withstands 100 times as much X-ray radiation as a human being.

Prof. Schneiderman received a five-year grant from the National Institutes of Health to continue his investigation of cell growth and aging.

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MEDICINE

By-Product May Be Better Than Aspirin

► DISCOVERY OF a new aspirin type of drug that is more effective and less toxic than aspirin is announced by a team of scientists from the British government's Chemical Research Laboratory, Teddington, and Allen and Hanburys, Ltd., in *Nature* (Jan. 29).

The drug has the long chemical name of 4-hydroxyisophthalic acid. It is a by-product in the manufacture of salicylic acid, which is a close relative of aspirin. It is found in the "brown dust" residues left in a purifying process used in salicylic acid manufacture.

Tests in rabbits and rats showed that it was less toxic than aspirin, and more effective in counteracting pain and fevers. Trials on human patients are now being made.

The studies were made by Allen and Hanburys scientists G. B. Chesher, H. O. J. Collier, F. A. Robinson and E. P. Taylor; and S. E. Hunt, J. Idris Jones and A. S. Lindsey of the Chemical Research Laboratory.

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MEDICINE

Mold Gives New TB Drug

Cycloserine, obtained from soil mold of the same family as yielded streptomycin, worked where other "wonder drugs" had failed.

► A NEW soil mold chemical for the fight against tuberculosis has been discovered.

Whether it will prove a big gun to finish the fight on the white plague will be determined by trials now starting in Veterans Administration hospitals around the nation.

The chemical is called cycloserine (pronounced with accent on the last syllable to rhyme with serene).

The soil mold that produces it belongs to the same family of organisms that produce streptomycin, famous since 1946 as a TB remedy.

Cycloserine was discovered by Roger Harned and Eleanor Kropp, microbiologists at Commercial Solvents Corporation laboratories, Terre Haute, Ind. The company has trademarked it Seromycin.

Both Commercial Solvents and Eli Lilly of Indianapolis who will put it up for medical use and market it are being extremely cautious about claims for the new drug. Plans for putting it on the market depend on the results of the pilot studies now to be made by VA as part of its world-famous TB chemotherapy program.

Cycloserine has been given for a three- to four-month period to 37 very sick patients at New York's Metropolitan Hospital. These patients all had tuberculosis of the lungs and 29 were chronic patients with far advanced

active tuberculosis. Intensive treatment with streptomycin, PAS and isoniazid for more than a year had not helped them.

Of these sick patients, 36 looked and felt better after cycloserine treatment. X-rays showed some improvement in infected lung areas in 28 patients. Thirty of them gained four to 14 pounds over a 16-week period. All who had been feverish lost their fever. Simple smears of sputum and stomach juice concentrates, previously positive for tuberculosis in all 37 patients, became negative in 30.

These encouraging preliminary results were reported by Drs. Israel G. Epstein, K. G. S. Nair and Linn J. Boyd of New York Medical College, New York, at the 14th VA-Army-Navy conference on tuberculosis at Atlanta, Ga., held in cooperation with the National Tuberculosis Association.

The new soil mold chemical was tried in infections of the genito-urinary tract by Drs. George R. Nagamatsu and Lois Lillick of New York Medical College and Dr. Russell D. Herrold of the University of Illinois College of Medicine, Chicago. They got good results in 46 of 62 stubborn infections which had resisted all other treatment.

These last results were summarized by Dr. Henry Welch of the U. S. Food and Drug Administration, Washington, D. C., who

also reported his own test tube studies of cycloserine. These showed it effective against a wide range of microorganisms, though its test tube effect was found to be relatively low.

Cycloserine, or Seromycin, may be able to cure tuberculosis by itself, though in the VA pilot study it may be given combined with streptomycin, PAS or isoniazid. The pilot study will be limited and intended to show chiefly the most effective dosages and combinations for use of the drug as well as its clinical effects on the patients.

The drug has some toxicity and Dr. Epstein reported it had to be stopped because of this in four of the patients in his preliminary trials.

While streptomycin, PAS and isoniazid give doctors very potent weapons against tuberculosis, they still hope for a drug or combination of them that will cure every case, even the very stubborn and dangerous ones in which the germs attack the brain or spread through the blood to all parts of the body. These forms are known as tuberculous meningitis and miliary tuberculosis respectively.

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CHEMISTRY

Rare Elements Useful For Atomic Reactors

► **TECHNETIUM** NOW joins zirconium as material for building atomic reactors.

Ability of technetium to soak up slow neutrons is revealed in the Atomic Energy Commission's 17th semi-annual report. This ability is an important new kind of information for designers of nuclear fission machinery, important because these materials themselves may take part in the radioactive disintegrations going on inside the reactor. Technetium appears to be like graphite, boron, cadmium, and zirconium in absorbing neutrons harmlessly.

Technetium is a "ghost" element, made in atomic reactors and occurring in fairly large quantities among the fission products. It does not occur in appreciable quantities anywhere else on earth, but is found in certain kinds of stars. All 15 forms of the element so far detected are radioactive. The half life of the most stable among its 15 isotopes is about 10,000 years.

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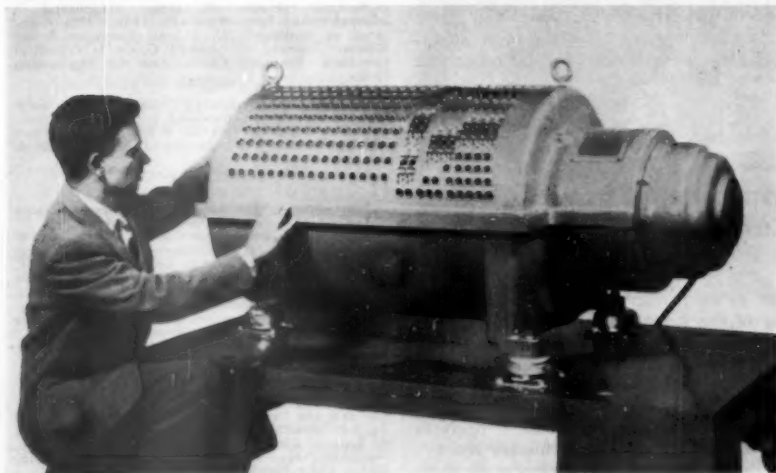
AGRICULTURE

New Orchardgrass For Forage and Hay

► A NEW variety of orchardgrass is being farmed out to state experiment stations in a move to get the seed into the hands of farmers in the shortest possible time.

Named Potomac, the grass is described by the U. S. Department of Agriculture as being superior to "standard varieties from the viewpoints of greater resistance to rust, greater hardiness, leafiness, and overall quality as forage or hay."

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MEMORIZES WEATHER—A revolving drum inside this unit can hold 2,000 messages containing data on weather and air traffic control. The information is fed into the device by a teletypewriter and would be immediately available to airport control towers. It has been estimated that 15 such units could service all the major air traffic centers in the nation. The device was developed by Remington Rand, Inc., for the Air Navigation Development Board.

PUBLIC SAFETY

Fall-Out A-Danger

Physicist says foxhole covered by board and newspaper gives "surprising protection" from invisible radiation that "rains" on earth's surface after nuclear explosion.

► THE GREATEST peril from a nuclear attack is the unseen mist of radioactive particles contaminating the air, not the immediate blast-heat-radiation effects of the explosion.

Simple foxhole shelters provide "surprising protection" from this invisible radioactivity, Dr. Ralph E. Lapp, consulting physicist of Washington, D. C., reported in the *Bulletin of the Atomic Scientists* (Feb.).

A foxhole scooped out of the ground, with a coat or newspaper thrown over a board for an umbrella, can cut radiation exposure for the occupant to less than five percent of what he would get standing in the open, Dr. Lapp calculated.

The Government should construct "an extensive system of survival shelters" eight miles or more from the center of every large city immediately, he urged. Simple, level-with-the-surface concrete shelters with additional earth shielding provide real protection, and can be built on school playgrounds, in between divided highways, on park property and on golf courses.

Total investment for this "mandatory" protection from fall-out, Dr. Lapp believes, need not exceed \$2,000,000,000.

Fundamental rule of survival in case of nuclear attack is "get below the surface of the earth." A person with his head below ground has ducked out of the "illumination" of radioactive rays from surrounding areas, thus greatly cutting down his dosage.

The maximum peril from fall-out is concentrated in the first day or in the most heavily contaminated area in the first two days, Dr. Lapp stated.

An H-bomb of the type tested on March 1, 1954, could make an area the size of Maryland, about 10,000 square miles, so radioactive that an exposed person would receive twice the deadly dose in the first day. From the end of the first day to the first week, a person remaining in the area would receive a lethal or near-lethal dose.

The danger would last for weeks following the explosion, thus preventing use of the region by humans.

Many metropolitan areas, Dr. Lapp concluded, "will become a kind of no-man's land should they become heavily contaminated." A city smashed into rubble would be almost impossible to decontaminate, and the "wisest thing to do with the central city would be to level it with demolition charges and bulldozers and cover it with earth, converting it into a huge metropolitan park."

Lakes instead of parks might be created in low-lying areas, such as Detroit, Chicago and Baltimore.

An attack, which Dr. Lapp described as

"small-scale," consisting of 28 superbombs, 18 dropped over major industrial cities east of the Mississippi and 10 exploded so as to blanket dense metropolitan areas with radioactive dust, would "atomize" an area normally occupied by 50,000,000 Americans. Over two-thirds of U. S. industrial production is centered in the same area.

Radioactive fall-out is the "third quantum jump" in the history of modern weapons. The first quantum jump, Dr. Lapp explained, was the A-bomb that shattered Hiroshima, destroying an area of about seven square miles. The second jump was the much more powerful bomb that spread its blast-heat punch over 300 square miles on Nov. 1, 1952.

The third jump — to lethal radioactive fall-out — is still too recent to be fully understood. But it calls for, at minimum, these actions, according to Dr. Lapp:

1. Dispersal of city populations to sites where they will not be crushed and burned.
2. Construction of a ring of simple shelters on the outskirts of large cities.
3. Dispersal of new industrial plants.
4. Equipping plants to shelter the working force for one week.
5. Special shelter rooms built in the basement of all new homes outside the city.

Although both the policies of evacuation and dispersion are still valid, Dr. Lapp concluded, they have to be coupled to a realistic shelter program. But the most important point is to educate the public on the facts of survival in the age of the "invisible killer," radioactive fall-out.

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TECHNOLOGY

Machines Shown That Can Outwit Man

► TWO SMALL electronic calculators that can outwit a man were shown at a meeting of the American Institute of Electrical Engineers in New York.

"Little Audrey" is a computer about as big as a large television set. She can distinguish three spoken words: yes, no and okay. With this repertoire she is ready to pit her circuits against the human brain.

"Pick a number," she challenges by flashing a card with the words on her screen. The person who accepts must then perform a series of calculations ordered by "Little Audrey," using the number he picked. He must also answer a few of the machine's questions by "yes" or "no."

Of course, she always guesses the number except when the person who accepts the

challenge says "yeah" instead of "yes." This confuses the device because it is the "s" sound in "yes" by which the machine distinguishes the word.

The second machine is an electronic "brain" that specializes in psychology.

A person sits before the Outguesser and signals "heads" or "tails" in any order he wishes. The device then attempts to anticipate which he is going to call out next. Computers inside the machine analyze each call and try to find out the person's strategy. The machine almost always wins.

The devices were shown by G. R. Frost and D. W. Hagelbarger of Bell Telephone Laboratories.

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PHYSICS

List 21 Atom Particles

Scientists have found many elusive particles including two new ones: K pi-two and K mu-two, in the nuclei of atoms. Some exist for only billionths of a second.

► **LOOKING INTO** the crowded cores of atoms, scientists are beginning to recognize some familiar faces.

Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study, Princeton, N. J., said 21 inhabitants of the core or nucleus, some of which exist only for fleeting bits of seconds, are listed now in the scientific census.

Some, such as the neutron which triggers the A-bomb, have long been known. Two new ones, the K mu-two and the K pi-two, received their birth certificates at a nuclear physics conference in Rochester, N. Y., said Dr. Bruno Rossi of Massachusetts Institute of Technology.

So elusive are these new particles that ten laboratories had to pool their information to pin them down. They have been glimpsed only 21 times.

Summing up advances in physics during the past year, Dr. Oppenheimer said it was "very striking" that physicists are not asking the same questions now as a year ago about the inner cores of atoms. Observations and calculations have settled a few of the questions.

But exactly what is going on in the nucleus is still a puzzle. Strange particles, not predicted by any theory, come whizzing forth, are seen for billionths of a second, then change their faces.

To pool their knowledge of these odd events, over 100 top nuclear physicists from the United States and abroad met at the University of Rochester. Reported at this meeting, the Fifth Annual Conference on High Energy Nuclear Physics, was a definite value for the effective size of the proton, the heart of the hydrogen atom.

It is seven times ten to the minus 14 centimeters. This is scientific shorthand for saying that a proton is 300 million millionths of an inch. High energy electrons were used by Stanford University physicists, led by Dr. R. Hofstadter, to probe the proton structure for this measurement.

Dr. Oppenheimer said that discovery of "clusters of masses"—"faces" in the nucleus with some features alike and others different—was one of the most important reports.

The "hot brother" theory, associated production of particles in pairs, seems to be confirmed in cosmic ray experiments. The associated production was predicted by theorists before it was actually discovered, Dr. Oppenheimer said.

Dr. Robert Bacher of California Institute of Technology and Dr. Robert E. Marshak of the University of Rochester joined Drs. Oppenheimer and Rossi in describing the present state of nuclear physics.

The 21 particles listed by Dr. Oppenheimer as currently accepted are electron, positron and neutrino; proton and neutron; mu mesons, found either positively or negatively charged; pi mesons, seen with neutral, positive and negative charges; theta zero; kappa mu and kappa e; lambda zero; sigmas, positively and negatively charged; negative chi, and the new particles, K mu-two and K pi-two, the latter found either positively or negatively charged.

K particles are mesons of mass intermediate between electrons and protons.

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FOUR MESONS CREATED—This unique picture shows a four-billion-volt meson smashing into a proton to create four pi mesons. The thin, vertical track entering from the top center of the photograph is that of the four Bev negative pi meson, and six tracks are seen from its collision with a proton. The path curving to the right is an electron. Of the other five tracks, mesons caused four and a positron the other. The positron and electron result from the decay of a neutral meson.

• RADIO

Saturday, February 26, 1955, 5:00-5:15 P.M. EST
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Morris Tepper, chief, severe local storms research unit, scientific services division, U. S. Weather Bureau, Washington, D. C., will discuss "Tornadoes."

PHYSICS

Matter From Energy At Four Billion Volts

► **THE MOST** powerful atom smasher in the world, the University of California's bevatron, is transforming energy into matter at the highest man-made energies ever produced.

Hurling protons at nearly the speed of light, physicists reproduced in the bevatron the disintegration of atomic particles previously known only from cosmic rays bombarding the earth from space. The tremendously high energy reported to the Fifth Annual Conference on High Energy Nuclear Physics in Rochester, N. Y., by Dr. H. M. Powell and co-workers was that of a four billion-electron-volt pi meson smashing directly into a proton. Four chunks of mesic matter and a proton resulted. Some of the energy of the bombarding nuclear particle was transformed into mesons.

Scientists are reaching higher and higher energies in atom smashing experiments. Their aim is to understand the forces which keep an atomic nucleus from flying apart. Mesons carry the nuclear force fields.

Another tool for investigating these forces was reported by Dr. Emilio Segre and his associates, also of the University of California. They have passed proton beams through two hydrogen filled chambers to get atoms whose spins are all in the same direction. Then the beam is passed through a carbon target. The resulting nuclear particles are analyzed with a scintillation counter.

Physicists call this a triple scattering, since protons in the original beam are bounced from three targets.

The University of California group is the first to perform triple scattering experiments, but this has been done so recently that the results are still being analyzed.

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ANIMAL NUTRITION

Lambs Fatten Faster If Shorn of Wool

► **LAMBS THAT** have their wool removed will fatten faster, while requiring less feed, than will their coated cousins.

In a two-year study made by Cecil Pierce, an animal husbandman at the Oregon State College eastern Oregon branch experiment station in Union, Ore., he found that shorn lambs fed in both open lots and shelters, gained more than 17% a day over the woolled lambs.

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GENERAL SCIENCE

STS Winners' Reports

Original projects helped 40 of the nation's top high school scientists win trips to Washington and a chance to compete for \$11,000 in scholarships.

► FORTY HIGH school scientists who came out on top in the nationwide Science Talent Search competition will meet in Washington, D. C., on Feb. 24 to compete for \$11,000 in Westinghouse Science Scholarships. They will also meet leading scientists and see important research laboratories during their five-day visit.

As a continuation of last week's series, here are some of the original scientific projects that helped them win the honor:

Charts Color Change

► A STUDY of the color changes in fruits and vegetables soaked in vinegar or ammonia was the scientific project of 17-year-old Alice Katherine Hartley, a senior at Bassick High School in Bridgeport, Conn.

Noting that the bright colors of food plants, such as red cabbage, blue grapes, beet roots and purple plums, change color in vinegar and ammonia, Alice made a study of these natural indicators.

She built instruments to measure the degree of acidity or alkalinity shown by the color of the juices she extracted from the plants, and the point at which the change in color occurs.

The career of research chemist in industry appeals to this young scientist, who flouts tradition by naming mechanical engineering as her second choice.

Studies "Water Dance"

► THE BEHAVIOR of drops of water that appear to dance on hot stoves was studied and photographed by 17-year-old Daniel Hughes Wilson of Kansas City, Kans.

The Summer High School senior was named one of the 40 winners in this year's Science Talent Search.

Using a self-designed and self-made special projection system to analyze the drop vibrations, known as the Lidenfrost Effect, the student scientist found that the horizontal vibrations observed are excited by vertical vibrations. He also discovered that there is a vapor film underneath the drop of water on which the drop floats and evaporates and that the vibrating drops make contact with the surface of the stove only on rare occasions.

Seeks Desert Insect

► TRACKING ACROSS the southern California desert for two weeks in search of a primitive "insect" helped Thomas Stafford

Briggs of San Francisco win his trip to the nation's capital.

The tall, lanky 16-year-old senior from Abraham Lincoln High School who some day hopes to be a professor of nuclear physics, has been named one of a group of 40 winners in the 14th annual Science Talent Search.

Setting up camp last summer on a weathered volcanic ridge 75 miles east of San Diego, the young scientist and a friend hunted night and day for solpugids, a highly elusive desert inhabitant which is not a true insect, but belongs to the same family as spiders and scorpions.

By the time his two weeks were over, Tom had collected several specimens of different types of solpugids, which he carried home to his own laboratory. He observed their habits in captivity and kept them alive by feeding them earwigs, crickets and moths.

'Flu Virus in Mice

► THE PUSH in recent years to develop effective vaccines against virus diseases, such as polio and influenza, inspired Carol Elnora Myers, age 16, of Canastota, N. Y., to find out whether mice could be successfully vaccinated against a strain of mouse influenza that would kill any non-vaccinated mouse.

She grew the virus on chick embryos, then harvested it from the eggs and treated part of it with formalin, to inactivate the virus. This became the vaccine. The vaccine was tested by vaccinating 15 mice. These and an equal number of control, unvaccinated mice were then given influenza virus in doses of three strengths.

All five of one group of vaccinated mice were able to withstand the strongest dose of virus, though this killed four out of five non-vaccinated mice. Against the weaker doses of virus, some non-vaccinated as well as all vaccinated mice survived. The reason, Carol gave as her opinion, was that the non-vaccinated mice had enough natural antibodies to overcome the amount of virus they received.

Hoping to attend Syracuse University and study a pre-medical course, she would like to become a medical doctor.

Next week the SCIENCE NEWS LETTER will publish more descriptions of the original projects submitted by the top winners of the Science Talent Search.

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Heart sounds of any frequency can be recorded with fidelity using the new direct-writing phonocardiograph.



COLOR RADAR—This device demonstrated recently to the Navy can project stationary and moving targets in separate colors. The effect is accomplished by two radar systems and a cathode ray tube similar to those used in color television. The set was developed by Chromatic Television Laboratories in New York.

BOTANY

Lighting Control Increases Blooming

► RECENT DEVELOPMENTS in lighting control have extended the growing season for chrysanthemums, asters and daisies, increasing the commercial value of these flowers.

Dr. Anton Kofranek of the department of floriculture and ornamental horticulture at the University of California at Los Angeles finds that chrysanthemums, naturally a fall-blooming plant, can be made to bloom earlier by shading during the day or later by applying artificial light at night.

Using such techniques, the mild-weather states of California and Florida supply much of the nation with field-grown "mums" the year around. California, with over 200 acres, produces most of the summer and fall crop. Florida, with 100 acres, grows much of the winter crop.

By using artificial light at night, field-grown, summer-blooming asters can be made to flower three months earlier, experiments on the Los Angeles campuses have shown. Through the same techniques they are now made to blossom out of doors in Florida during the winter.

Other artificial lighting experiments at U.C.L.A. have made it possible to hasten flowering of daisies, which bloom naturally in late spring, by as much as six weeks. About 60 acres of daisies are growing under artificial lights this year in California, which practically has a monopoly on their production.

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MEDICINE

Drug To Help Addicts

► **CRYING, FRETFUL** babies who cannot sleep or gain weight, drug addicts in a police station, epileptics and victims of head injuries, skin disease and headache sufferers and mental patients outside of institutions have been getting help in varying degrees from reserpine, the Indian root medicine already widely used to reduce high blood pressure.

The new medicine's wide range of usefulness apparently comes from its quieting, or "tranquilizing" effect. (See SNL, Feb. 12, p. 102.)

Use of reserpine in cases of narcotic drug addiction was reported in New York by Dr. Eugene F. Carey, surgeon of the Chicago Police Department. Dr. Carey spoke at a conference on reserpine held at the New York Academy of Sciences.

Used in an experiment at Chicago police headquarters, reserpine helped to "cancel out the mental terrors and fears" which plague addicts who have been deprived of their favorite drug by law enforcement officers.

By producing a "tranquilizing effect" in the addict, reserpine makes withdrawal sickness easier for him to bear, Dr. Carey found. He said treatment with reserpine may prove to be extremely important in aiding the drug addict, since his mental attitude is of paramount importance and "can in fact, make him or break him."

For headaches, reserpine apparently is

most helpful when high blood pressure is involved. Tension headaches are helped somewhat, migraine not at all, Dr. Arnold P. Friedman of the Headache Clinic at Montefiore Hospital, New York, reported on the basis of preliminary trials.

The overall condition of headache patients was "greatly improved" so that specific medicines could be used more effectively or were not necessary, Dr. Bernard M. Barrett of Pensacola, Fla., and Dr. F. K. Hansel of Washington University School of Medicine, St. Louis, reported from their headache study.

The tranquilizing effect of reserpine was credited for bringing relief to patients miserable with itching skin trouble and this same tranquilizing effect was seen responsible for banishing the irritability, moodiness and changeable personalities of patients suffering from convulsive disorders such as epilepsy. The results of trying the drug in skin conditions were reported by Drs. Charles R. Rein and John J. Goodman of New York. The use of the medicine in epilepsy and for head injury victims was reported by Dr. Vasilios S. Lambros of Arlington Hospital, Arlington County, Va.

The reserpine conference was under the chairmanship of scientists from Ciba Pharmaceutical Products, Inc., Summit, N. J. The Ciba brand of reserpine is called Serpasil.

Science News Letter, February 19, 1955

DENTISTRY

Blame Strep. for Decay

► **A MEMBER** of the streptococcus germ family is now blamed for causing tooth decay.

Studies showing that this strep., called an enterococcus, caused tooth decay in rats have won the 14th annual prize essay award of the Chicago Dental Society for Dr. Frank J. Orland and associates of the University of Chicago's Walter G. Zoller Memorial Dental Clinic in Chicago.

The germs most commonly thought responsible for tooth decay, the acid-producing lactobacilli, were not involved at all. But the enterococci also produce acid that dissolves away the tooth enamel to allow invasion of the softer tissues underneath.

The average human mouth may have a hundred or more different forms of bacteria, or germs in lay terms, the scientists pointed out.

Enterococci are found in human intestines.

How many other bacteria are involved in tooth decay, and what can be done about it, are not answered by the studies.

The rats in the tests were grown from birth in the germ-free chambers of the Lobund Institute at Notre Dame University,

Ind. One group of rats, in the germ-free environment, had their mouths swabbed with enterococci and one other organism. Another group was raised in a normal, germ-laden environment. Both ate the same diet, which was known to encourage tooth decay in non-germ-free rats.

The rats with normal mouth germs developed serious tooth decay. And the inoculated rats in the otherwise germ-free environment were found upon examination also to have developed typical symptoms of decay.

Bacterial examination showed the enterococci to be the predominant organism while the second organism could only rarely be found. After the rats were killed, microscopic photographs of slices of the teeth showed that only the enterococci had deeply invaded the decayed areas.

The rats developed decay up to an old age equivalent to a human age of 20 years. This decay was produced in spite of the fact that the rats were not exposed to the acid-producing lactobacilli.

Associated with Dr. Orland from Chicago were Dr. J. Roy Blayney, emeritus director of the Zoller Clinic, and R. Wendell

Harrison, professor of microbiology and vice-president of the University.

Heading the group from Notre Dame were James A. Reyniers, director of the Lobund Institute, and Philip C. Trexler, Robert F. Ervin, Helmut A. Gordon and Morris Wagner. The research was supported in part by contracts from the Office of Naval Research.

Science News Letter, February 19, 1955

TECHNOLOGY

Transistor to Convert DC to AC in Missiles

► **THE GERMANIUM** transistor, versatile little crystal substitute for the radio tube, was described as an ideal converter of weak DC electricity to AC in guided missiles.

Such transistors, now being tested, are not only small and light, but they are practically immune to shock and vibration. Other advantages of the device, called a "chopper," as explained to the American Institute of Electrical Engineers in New York by A. P. Kruper of Westinghouse Electric Corporation, East Pittsburgh, Pa., are:

It works from about 58 degrees below zero to 194 degrees Fahrenheit. It can operate on a fraction of a millivolt of electricity. It has long life.

The conversion from DC to AC is desirable, he pointed out, because AC amplifiers are much easier to design and are free of the drift and instability of DC amplifiers.

Science News Letter, February 19, 1955



MICROSCOPIC MAZE—The zig-zag pattern of bismuth manganese crystals are visible for the first time through a microscope with use of a strong varying magnetic field. The stripes represent areas of alternating magnetic polarity found by Dr. Benjamin W. Roberts of General Electric Research Laboratory.

GEOLOGY

Last Ice Age in U. S. Strong 10,000 Years Ago

► THE LAST great ice age was still going strong in America 10,000 years ago when the immense glaciation of northern Europe was in full retreat.

Through radiocarbon dating of debris left by the masses of ice as they scoured the landscape, Dr. H. E. Suess and Meyer Rubin of the U. S. Geological Survey have worked out relationships of the ice ages in America and Europe, finding that events in the New World are later than in the Old World.

Before the development of the method of determining age by the radioactivity of carbon 14 contained in ancient material, the end of the latest or Wisconsin glacial stage in the United States was dated at about 25,000 years ago. Determinations by Dr. Willard F. Libby of the University of Chicago, now an Atomic Energy Commissioner, first showed that the date was about 10,000 years ago. The U. S. Geological Survey scientists have been working out the relationships between the last great ice invasions here and in Europe.

They find that whereas the glacial retreat began in Europe 13,000 to 11,000 years ago, as late as 10,000 years ago the Great Lakes region was covered with ice and there was a rapid retreat on this continent prior to 6,000 years ago. The four substages of glaciation in America are all contemporaneous with the latest or third part of the last European glaciation, designated as Wurm III.

Radiocarbon dating is based on the decreasing of radioactivity with time of the kind of carbon transmuted from nitrogen of the upper air by cosmic ray bombardment. This carbon 14 with its self-contained time-clock is washed down by rain as carbon dioxide and enters into all living things, dating them for the scientists who have learned how to detect and measure their exploding atoms.

Science News Letter, February 19, 1955

METEOROLOGY

Lightning Bolts Vary In Speed and Current

► FAST AS lightning! That can mean anything from less than 100 microseconds (1/10,000 of a second) to almost a full second, the American Institute of Electrical Engineers was told in New York.

That is the range of time it takes for the current from different bolts of lightning to build up and fall as they hit an object.

Lightning flashes also vary widely in the amount of current, or amperes, they contain. The median amperage, as found by A. M. Opsahl of Westinghouse Electric Corporation, was about 20,000 at the bolt's peak, but he said he measured one that reached to 200,000 amperes.

The two factors, time and current, determine whether a lightning flash is "hot" or "cold," he said.

"The lower currents of short duration cause insignificant damage. The results of higher energy strokes are very spectacular."

He explained that when lightning strikes the earth, a stroke current flows that is almost entirely unaffected by the object it hits. If the object is not a good conductor, as a tree or a chimney, it can be damaged. But the lightning rod protects such objects by providing an adequate path to the ground.

It is not safe to stand within six feet of a ground rod that is struck, he pointed out, for the electricity may jump. If you stand too close you may become part of the path to the ground with the current going up one leg and down the other.

Science News Letter, February 19, 1955

MEDICINE

Atomic Energy Fights Hard-to-Cure Cancers

► ATOMIC ENERGY is being turned in new ways to fight three of the more difficult to cure cancers, those of brain, lungs and pancreas.

First word of the new approach to cancers of lungs and brain appears in the 17th semi-annual report of the Atomic Energy Commission.

This approach is being made with one of the radioactive cesium isotopes. With the aim of getting the cancer-destroying radiation directly into the lung or brain cancer, plastic envelopes containing cesium will be implanted in chest or brain. This work, under the direction of Dr. Paul Harper at the Argonne Cancer Research Hospital, Chicago, is still in the experimental laboratory stage, Dr. Harper told SCIENCE SERVICE. Trials on patients are still in the future.

Already tried on six patients, however, is the new approach to stopping cancer of the pancreas. In this, plastic tubing containing radioactive iodine is threaded through the tumor and surrounding pancreas tissue.

"We don't think we have lengthened anyone's life," Dr. Harper said.

The method did, however, give good palliation, that is, relief of pain.

Dr. Harper and associates hope that in cases of very small tumors of the pancreas, they might by this technique be able to give a big enough dose of radiation to burn out the cancer. Advantage of the method for tumors of the pancreas or other internal organs is that only one operation is needed.

Often the surgeon operates without being sure he will find cancer. Then, if he does and wants to use radium needles, for example, he will have to sew up the wound and re-operate later because radium needles may not have been at hand.

With the new technique, plastic tubing which can be kept ready and sterilized in any operating room can be immediately implanted, with the ends left sticking out of the wound. A few days later, the radioiodine can be put in. Added convenience is that the tubes need not be removed.

Science News Letter, February 19, 1955

IN SCIENCE

ICHTHYOLOGY

Insomnia Shortens Baby Fishes' Lifetime

► FISH GOTTA swim, but baby fish gotta sleep too.

During a study of baby fish or larvae made at the marine biology station of the University College of North Wales, Bangor, Wales, S. Z. Qasim found that the little fish fared better after a good night's sleep.

Experiments showed that baby fish who were forced to have no sleep did not survive as well as those allowed to have a period of inactivity in the dark. The experiments also showed that baby fish kept in continuous darkness always had empty stomachs.

"The inactivity of the larvae, which is presumably shown every night," Mr. Qasim reported, "recalled previous accounts of sleeping in fishes."

The sleeping habits of the baby fish were reported in *Nature* (Jan. 29). They were discovered during a study of the biology of two shore fishes.

Science News Letter, February 19, 1955

ENGINEERING

Electronic "Brain" Can Solve Traffic Problems

► A MINIATURE highway intersection simulated inside the metallic guts of an electronic computer may soon be used to study traffic flow at proposed highway junctions.

Electrical impulses, each representing a car, are "stopped," make right and left turns, obey "traffic signals" and watch out for "pedestrians" and "other cars" in the maze of circuits.

The design of such a device, called a discrete-variable simulator, was described to a meeting of the Highway Research Board. A suitable computer for traffic study of this sort could be built around the operational-amplifier type integrator, said Drs. J. H. Mathewson, D. L. Trautman and D. L. Gerlough of the Institute of Transportation and Traffic Engineering of the University of California at Los Angeles.

Two other possible traffic simulators, a continuous-variable model in which individual cars are not accounted for but a statistical flow of electricity is maintained, and a digital computer in which traffic and road conditions are represented by digits, were also described.

Such electronic "brains" could help designers find the most efficient pattern for a specific intersection and perhaps show ways to improve traffic conditions at present highway junctions.

Science News Letter, February 19, 1955

IE FIELDS

GEOGRAPHY

Geographers Help Army Live in Deserts

► AMERICAN TROOPS will be better equipped for desert warfare of the future because of an 18-month research project by geographers at the University of California at Los Angeles.

The work was done in the Providence Mountains of the Mojave Desert for the Army Quartermaster Corps which wanted to learn everything possible about the climate, vegetation and topography of a typical desert mountain range.

In charge of the project were two young U.C.L.A. professors, Drs. John F. Gaines and Richard F. Logan.

To gather round-the-clock, round-the-calendar weather data on this area, 14 small weather stations were erected at various elevations. For 10 blistering days last summer, Dr. Logan lived at the summit alone to complete necessary weather observations.

Some surprises received by the researchers included the discovery that desert mountain summits are warmer on winter nights than is the desert floor. Summertime humidity is considerably higher than winter humidity. And dark-colored basaltic rock is 30 degrees hotter in summer than is light-hued granite.

Gusty winter winds up to 60 miles per hour wore nerves raw and tempers thin, the two men reported.

Science News Letter, February 19, 1955

NUTRITION

Potato Quality Label To Aid Housewives

► SCIENTISTS ARE trying to take the guesswork out of potato buying and put it on a label.

Intensive experiments on the nation's various potato varieties are now being conducted to determine just what makes a particular tuber good for baking, boiling, chipping, frying or mashing. Human nutrition and marketing-research scientists of the U. S. Department of Agriculture have already learned that variety, region, year and storage all make a difference in quality.

"It is easy to see from the findings," a report to *Agricultural Research* (Jan.) stated, "why a shopper cannot tell, just by looking, whether a market lot of potatoes will prove mealy, as potato eaters generally prefer tubers to be for baking or boiling. Mealiness may differ, not only with variety, but in the same variety grown in different locations and in succeeding crop years."

Storage brings changes too, the scientists claim. The longer potatoes were stored, the less mealy and more soggy they became. On

the other hand, storage at a low temperature of about 40 degrees Fahrenheit lessened sloughing in potatoes that had a tendency to come apart when boiled whole.

Cooking methods did not affect the mealiness or the dryness of the potato, Mary E. Kirkpatrick, food specialist, reported.

"A potato that was dry and mealy when boiled, was dry and mealy when mashed or baked," Miss Kirkpatrick said.

Dry matter, alcohol insoluble solids and starch are all good indicators of the qualities potato eaters prize, Dr. Peter H. Heinze, a plant physiologist, said. But a simple test of whether a potato sinks or swims in salt water is still a good predictor of its boiling and baking qualities. Sinkers are likely to have a high quality when baked, boiled or chipped, while floaters are likely to have a low quality.

The scientists hope that potatoes of the future will come to the market, labeled to help buyers select the bakers from the boilers, the boilers from the mashers, the mashers from the fryers, and so on, just like chickens.

Science News Letter, February 19, 1955

AGRICULTURE

Rice Disease Traced To Excess of Iron

► ALTHOUGH NEW York is not a rice-growing state, three scientists at Cornell's College of Agriculture in Ithaca, N. Y., have discovered what appears to be the cause of a widespread rice disease, known in Java, Malaya, Ceylon, India and Burma.

Browning of rice leaves and roots was observed in greenhouse tests of rice grown in submerged soil and traced to too much ferrous iron. No disease organisms were found to account for the effect. The symptoms were somewhat like those of potassium deficiency.

The Cornell agronomists, who published their report in *Nature* (Feb. 5), are F. N. Ponnampetuma, R. Bradfield and M. Peech.

Science News Letter, February 19, 1955

ZOOLOGY

Pair of Tapirs in Zoo From Siam Capital

► A PAIR of new arrivals in the United States, half-grown Malayan saddleback tapirs, have taken up residence in the Washington Zoo. They came from Siam.

Dr. William M. Mann, director of the National Zoological Park, reported that this kind of tapir has not been represented in the national collection for years. The only such animal listed in the United States in recent years is an old male in the San Francisco zoo.

Tapirs are the nearest living relative of horses and rhinoceroses, and the Malayan sort is the only representative of this family not living in Central or South America.

Science News Letter, February 19, 1955

PUBLIC HEALTH

Rubbish to Follow Garbage Down Drain

► RUBBISH AND refuse of all sorts, not just garbage, will literally be flushed down the drain.

This is the expectation of Albert Bush of the engineering department of the University of California at Los Angeles after a study of refuse disposal problems.

"Garbage grinders have made considerable inroads into the garbage disposal problem," he declared. "With further developments in the use of water transport we may be able to get rid of other household rubbish in a similar manner."

Disposal of all refuse right in the home appears to be the best solution to both air pollution and economic aspects of the problem if such methods can be developed, Mr. Bush believes. He finds that municipal incinerators apparently do not solve air pollution problems. Collection is expensive and merely transfers the problem to another site.

A comparative study of municipal and home incinerators by Mr. Bush, Stewart Mulford and Edwin Bowler of the U.C.L.A. engineering staff has suggested that the big incinerators contribute as much to air pollution as the home variety.

Science News Letter, February 19, 1955

MEDICINE

Could Synthesize Drug For Radiation Anemia

► BATYL ALCOHOL promises to become a prized material for possible protection against atomic radiation. Liver oil from ratfish is the richest source of batyl alcohol, which reports from Stockholm show is a promising chemical for treatment of white blood cell anemia caused by radiation. If used for atomic defense, it would need to be synthesized. (See SNL Jan. 25, 1954, p. 412.)

In 1941 Prof. Harry N. Holmes of Oberlin College in Oberlin, Ohio, was the first to isolate batyl alcohol from land animals. He found in the yellow bone marrow a substance that might increase the white blood cells, or phagocytes, in the blood of people needing such stimulation. Now Prof. Holmes suggests that this batyl alcohol and related substances should be used to save lives of people exposed to radioactive dust from a hydrogen bomb explosion.

Since ratfish are not commercial and bone marrow is obtainable only in very limited quantities, our radiation defense must look to synthetic batyl alcohol for help.

Sir Ian Heilbron and associates in England in 1930 devised a synthesis which was later improved by Prof. Holmes and Dr. Nathan Kornblum in 1942.

Selachyl alcohol, a liquid readily hydrogenated to yield batyl, was also separated from ratfish liver oil in the Oberlin laboratories.

Science News Letter, February 19, 1955

ANTHROPOLOGY

Extinct "Uncle" Gave Us Fire

All our principal weapons against the cold were given to our ancestors by Neanderthal. This eastern relative may have also given our direct ancestors their first lessons in religion.

By MARJORIE VAN DE WATER

► MAN'S IMPORTANT weapons against the cold—housing, clothing, and fire—were not inventions of our direct ancestors. They were given to him by an extinct "uncle" of the human line, Neanderthal man.

These important inventions enabled ancient man to brave the cruel cold of Europe during the ice ages and to spread out to conquer the world.

Our debt to Neanderthal for these means of human survival is acknowledged by a new theory proposed by Dr. J. E. Weckler of the University of Southern California.

In the early years before the third interglacial period, early man was a wanderer. Like many other animals, he followed the climate. Between glacial periods, he would drift northward into Europe. The movement was probably slow and largely unplanned, because the climatic changes occurred slowly over periods of thousands of years. A shift in a band's range of only a few miles per generation would be enough to enable early man to keep up with the gradually changing climate and the animals and plants that were his familiar food.

When Europe froze up again with the next advance of the glaciers, man retreated slowly into his original birthplace, Africa.

The tribe that re-invaded Europe and India when the earth warmed up again did not include the same individuals who lived there earlier. The new tribe was more advanced.

Meantime, on the other side of great geographical barriers, Neanderthal was develop-

ing independently. Neanderthal in inner Asia was a stay-at-home, not a wanderer. He did not find it so easy as did his European nephews to escape by migration the waves of bitter cold which came with the advancing ice sheets. Impassable frozen mountain peaks stood between him and the sunny south. Having lived where he was for hundreds of generations, Mr. Neanderthal would not have known he could escape the cruel cold by moving east several hundred miles before he turned south.

So it was that the cold cut down tremendously the surviving numbers of Neanderthals. For those who did survive two important things happened. In the first place, with succeeding generations Neanderthals became adapted physically to withstand the cold. They developed a short, stocky build with thick, heavy bones.

Developed Clothes

Then, as with modern man, when he could not run away from his problem, he put his intelligence to work. He invented ways to help him survive in the cold. He learned to put on clothing and to huddle in the shelter of caves and close to fires to keep himself warm.

It was after this, when the climate warmed up after the cold of the third glaciation, that his numbers increased and he did finally expand his range. Then he explored the lowlands north of the barrier and reached northwest India and eastern Europe.

Here he met the ancestors of modern man, known to scientists as *Homo sapiens* (Intelligent Man). And in this mingling, socially and by mating, *Homo sapiens* gained new ideas and new genes.

This gave *Homo sapiens* a double-barreled preparation for setting out to conquer the world. The new genes provided him with more variety in his physical makeup for natural selection to work on in adapting him for life in varied climates. The new ideas offered him protection for his naked body against the rigors of climate.

It was the mixture of Neanderthal and *Homo sapiens* that produced the new kind of Neanderthal that has long puzzled anthropologists and which they term the "Progressive" Neanderthal.

But man has to thank his now-extinct uncle Neanderthal for more than the original invention of basic creature comforts, Dr. Weckler suggests.

Man probably gained from Neanderthal also the early beginnings of religion, magic and belief in a supernatural power and in a life after death.

The earliest recorded human burials were those made by Neanderthal during the European Mousterian, Dr. Weckler points out. The Mt. Carmel Neanderthals probably practiced burial too, he says.

"The magically oriented art complex of the Upper Paleolithic, the origin of which is otherwise unexplained," Dr. Weckler points out, "could be the result of enrichment by *Homo sapiens* of these basic ritual ideas obtained from Neanderthal."

It was when *Homo sapiens* had thoroughly assimilated and improved on the ideas he got from Neanderthal that he took advantage of the relative warmth of the first interstadial of the Wurm glaciation to launch forth on his initial conquest of the world.

Overran Europe

It was at that time that he overran Europe and pushed around the barrier into eastern Asia. And at that time also, he may have discovered and colonized the New World some 20,000 to 25,000 years before the first voyage of Columbus.

The New World has been considered by anthropologists as very new indeed from the point of view of occupancy by man.

Traces of ancient man found in Alaska, near the former land bridge over which men must have crossed to the New World from Asia, dated back to only about 3,000 B.C. This was the time when men in the Old World were entering the Bronze Age.

Men had already mastered the great art of tilling the soil and herding animals. The wheel had been invented and put to use, first in making pottery and later on chariots. The invention of the wheel, together with the boat and sail and the domesticated donkey enabled the kings of those days to whisk armies about to conquer and plunder their neighbors in an early kind of "blitzkrieg."

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NEANDERTHAL FAMILY LIFE—This exhibit at the American Museum of Natural History, New York, shows how this "uncle" of modern man used bones and clothing to protect him from the cold—lessons he passed on to our direct ancestors.

anthropologists found a peculiar fluted stone weapon point which geological evidence indicated was of great antiquity. These "Folsom points" indicated that man must have lived in America some 10,000 to 12,000 years ago. But for many years, only the weapons of Folsom Man were found; not a trace was unearthed of Folsom Man.

In 1947, a gentleman of comparable antiquity was unearthed in Mexico, Tepexpan Man. And last year, new evidence showed that without question Tepexpan Man lived at the same time as, and actually hunted down, giant elephant-like mammoths that are now extinct.

As the search goes on for ancient man in America, the time over which he has occupied this hemisphere is gradually being

extended. A skull has now been found which is believed to have belonged to Folsom Man or perhaps an even earlier American.

This year, the era of man in America was doubled in length. Radiocarbon dating of charcoal from the campfires of man were dated at 23,000 years for a find in Tule Springs, Nev., and at 26,000 years for remains from Sandia Cave, N. Mex.

The campfire by which those early Americans warmed cold fingers and toes, and which enabled the 20th-century atomic physicist to date their presence here, was the important invention which ancient *Homo sapiens* learned from his rough and ready Uncle Neanderthal.

Science News Letter, February 19, 1955

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ATOMS FOR PEACE—David O. Woodbury—Dodd, Mead, 259 p., illus., \$3.50. A science writer tells of the brighter side of what the new force, atomic energy, may contribute to our future.

BETTER HOMES AND GARDENS DIET BOOK—Donald G. Cooley and Foods and Book Editors—Meredith Publishing Co., 253 p., illus., \$2.50. A readable book to help you take off any extra pounds without pain.

DAMMAR AND MASTIC INFRARED ANALYSIS—Robert L. Feller—Mellon Institute, 2 p., illus., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

THE DEVELOPMENT OF THE CONCEPT OF ELECTRIC CHARGE: Electricity from the Greeks to Coulomb—Case 8 of the Harvard Case Histories in Experimental Science—Duane Roller and Duane H. D. Roller—Harvard University Press, 97 p., illus., paper, \$1.60. Tracing the interesting story of the beginnings of our knowledge of a most important scientific phenomenon.

THE EFFECTIVENESS OF DELINQUENCY PREVENTION PROGRAMS—Helen L. Witmer and Edith Tufts—Govt. Printing Office, Children's Bureau Publication Number 350, 50 p., paper,

25 cents. We are on our way, the authors conclude, toward learning what does and what does not prevent delinquency, but we still have far to go.

EMOTIONAL PROBLEMS AND WHAT YOU CAN DO ABOUT THEM: First Aid to Wiser Living—William B. Terhune—Morrow, 190 p., \$3.00. Advice by a psychiatrist on what to do about your own problems and those of your family and your friends.

GENERAL SCIENCE—Victor C. Smith and W. E. Jones—Lippincott, 504 p., illus., \$3.80. A textbook for use with pupils who have had little or no previous science study.

GENERAL SCIENCE WORKBOOK—Victor C. Smith and W. E. Jones—Lippincott, 187 p., illus., paper, \$1.60. A book of experiments and demonstrations to accompany any complete one-year general science textbook.

AN INTRODUCTION TO PSYCHOLOGY—Harry W. Karn and Joseph Weitz—Wiley, 315 p., illus., \$3.90. A textbook for students in a single-semester course in schools of education, engineering, business administration or other fields.

THE LOST VILLAGES OF ENGLAND—Maurice Beresford—Philosophical Library, 445 p., illus., \$12.00. Sites in England existing as communities in the Middle Ages which have since vanished except for hollows and vegetation variations visible now to the aerial camera.

MAGNETIC AMPLIFIERS—H. F. Storm and others—Wiley, 545 p., illus., \$13.50. For electrical engineers and graduate students.

MANPOWER RESOURCES IN THE EARTH SCIENCES—Solomon Shapiro under the direction of Helen Wood—Govt. Printing Office, National Science Foundation Publication, 75 p., illus., paper, 45 cents. A study of questionnaires filled out by more than 12,000 earth scientists.

PETROLOGY FOR STUDENTS: An Introduction to the Study of Rocks Under the Microscope—Alfred Harker—Cambridge University Press, 8th ed., 283 p., illus., \$3.50. Written to serve as a guide to the study of rocks in thin slices, and addressed to geology students who are not specializing in petrology.

PREPAYMENT AND THE COMMUNITY: Volume 2 of Financing Hospital Care in the United States—Harry Becker, Ed.—McGraw-Hill, 356 p., illus., \$4.50. A second report of the Commission studying the problem of medical care.

THE RADIO AMATEUR'S HANDBOOK—Headquarters Staff of the American Radio Relay League—American Radio Relay League, 32d ed., 541 p. plus 67 p. of Vacuum-Tube data, illus., paper, \$3.00 plus postage. A how-to-do-it and reference work for radio "hams" and those who want to learn about radio set-ups.

SOCIOLOGICAL THEORY: Its Nature and Growth—Nicholas S. Timasheff—Doubleday, 328 p., \$4.50. A study of the history of ideas and what certain leaders have contributed to the advancement of sociological theory.

TWO EARS OF CORN, TWO BLADES OF GRASS—D. H. Killeffer—Van Nostrand, 139 p., illus., \$4.00. Unlike our material resources which must surely one day be exhausted, our creative intelligence and the products of science grow as they are used.

WHEN THEY WERE BOYS: Sixteen Boyhood Stories of Famous Men—Patrick Pringle—Roy, 224 p., illus., \$3.00. These sketches include

boyhood biographies of such famous scientists as Leonardo da Vinci, Benjamin Franklin, Michael Faraday and Joseph Lister.

YOUR MONEY'S WORTH IN CLOTHING AND TEXTILES—Jules Labarthe—Mellon Institute, 5 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

Science News Letter, February 19, 1955

MEDICINE

Bone Growth Pressure Equals Body Weight

► **BONES GROW** with a pressure equal to the weight in pounds of the growing animal or child. In some cases this may total 300 pounds or more.

This finding, important to surgeons correcting bow legs, knock knees and some other deformities, was announced by Drs. L. J. Strobino, Paul C. Colonna, Thomas Leinback and R. S. Brodey of the University of Pennsylvania, Philadelphia, at the meeting of the American Academy of Orthopaedic Surgeons in Los Angeles.

The studies were made on 10 Holstein calves. In one part of the work, the scientists found that bone growth under controlled conditions broke 3/32 inch steel staples.

They said it would take 900 pounds to break such a staple under direct pull.

Surgeons sometimes equalize leg lengths in a child by arresting the growth of the long bones in one leg. Sometimes this is done by mechanical obstruction. In some cases, surgeons have tried to stimulate growth in the short bone.

The studies showed that after bone growth had been arrested mechanically, normal growth process could start again.

In one experiment reported, a tension spring instrument was inserted in the leg of a 150-pound calf. The force of the growing bone was stopped completely by the tension instrument.

Readings were made at regular intervals by X-rays which penetrated the instrument and showed the degree of compression.

After growth had been stopped for as long as six or seven months, which is equivalent to three to four years in the human being, the instrument was removed. The bone growth resumed then at an accelerated rate sufficient to catch up with the opposite normal leg of the animal.

Science News Letter, February 19, 1955

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INVENTION

Develop Vinegar Pill For Camping, Soldiers

► FOX HOLES may soon become a mecca for the amateur chef who delights in concocting savory sauces and salad dressings.

Picnic wieners, freshly-dug clams and campsite venison are in for a dash of the gourmet's magic.

This has all been made possible with the granting of a patent to two scientists for a dry, imitation vinegar which, they claim, can be safely carried in pocket-size packages or even loosely in tablet form.

The inventors, Thaddeus C. Kmiecik and Kenneth T. Farrell of Chicago, have envisioned new worlds of gastronomical joy through the use of their vinegar powder and other portable, dry condiments.

This is the way it will work:

When a camper or picnicker packs his gear and food stuffs, he will also take along a few vinegar pills, some dehydrated tomato juice powder, dehydrated onion powder, mustard powder, dehydrated soy powder and whatever other dry powder he desires.

When he is ready to concoct his meal, he mixes the ingredients as he sees fit, adds water, and "voila!" catsup, chili sauce, salad dressing, Worcestershire sauce, ad infinitum.

Seen primarily as an aid to the military, the dehydrated vinegar is easily converted back into a liquid condiment by simply adding water. Before the advent of the vinegar pill, the armed services considered it a bit impracticable to include vinegar in emergency rations because of spillage, space and weight. The invention was awarded patent No. 2,696,441.

So, if you happen to see someone take a pill from his vest pocket, drop it into a glass of water and then dump it on his salad, do not become excited. He is probably only dressing his greens.

Science News Letter, February 19, 1955

AGRICULTURE

Farmers Warned of Attacks by Corn Borers

► THE NATION'S corn belt farmers were warned that they may be faced with a serious infestation of the European corn borer this year. Latest figures available reveal that in 1953 the corn borer ate its way through the equivalent of 90,000,000 bushels of grain corn, or three percent of the total national crop. Losses from the 1953 infestation amounted to an estimated \$125,466,000.

Based on field surveys made last fall by 25 states, the U. S. Department of Agriculture issued its warning that 1955 will bring on heavy attacks by the corn borer if spring weather is favorable for the insect's development.

Biggest problem areas, the Department reported, are likely to be in central Iowa, northeastern Nebraska, southeastern South Dakota and central Illinois. Missouri and Ohio might also feel sharp increases over last year's infestation.

There is very little farmers can do before the corn is planted to prevent the corn borer from infesting a crop, Arlo M. Vance, an entomologist at the Agricultural Research Service at Beltsville, Md., stated.

"We do have fairly good control with insecticides," the scientist reported, "primarily DDT." However, once the insect begins to bore, Mr. Vance reported, there is no effective control measure.

The corn borer is essentially a boring insect as its name implies. In the spring the moth lays its eggs on the plant. Greatest injury results from the tunneling and feeding of the young worms that eat through the stalk, ears, tassel, midrib of the leaf and brace roots.

Three main facts were pointed out in the report for this coming corn season that has been made by the Cooperative Economic Insect Survey:

1. For 13 north central states, the corn borer populations last fall averaged 223 insects for every 100 corn stalks as compared with an average of 114 per 100 for the fall of 1953.

2. The corn borer picture is not entirely discouraging in that the average population of these insects took a sharp drop in 12 eastern states.

3. Now known to occur in 37 states, no new states reported attacks by the corn borer last year.

Science News Letter, February 19, 1955



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Spring's Harbinger

► IT WILL be several weeks yet before the spring poets unlimber their lyres and begin to sing the praises of crocuses and hepaticas and shy, modest violets. But the hardest harbinger of spring, the skunk cabbage, is at this moment probing its way up through the frozen soil, and even cracking thin ice on swamps, all over the East and throughout most of the Mississippi valley.

This sturdy flower defies a frosty and unfriendly world wherever the flat floor of a swamp or bog gives space enough for its rather expansive temperament. Right along with the alders, earlier than the pussy-willows, offering competition to that strange winter flowering shrub the witch-hazel, the skunk cabbage comes into bloom.

You can find skunk cabbages determinedly pushing plates of ice away, and unfolding their grotesque flower-sheaths through the holes they have made for themselves, with the thin sheets of frozen water leaning edgewise against them. If a thaw lets these plants get started, a subsequent freeze is of no avail; they keep right on coming in spite of it. It would take a genuine cold wave, driving the frost deep into the ground again, to stop them.

This great precociousness on the part of the skunk cabbage is made possible by its food hoard from the preceding summer.

Like most vernal-flowering plants, it has a thick and fleshy rootstock, stored with starch, which supplies the energy and material needed for the growth it makes during a season when the sun gives scanty encouragement and the frozen earth even less.

This precociousness also makes it possible for the skunk cabbage to produce blossoms and have the important business of making seed well under way before other plants have even started.

There is no real need for the spring poets to turn up their noses so superciliously at the skunk cabbage. It offends nobody's nostrils unless it is trodden on or otherwise abused—and who would not fight back then? In this it is like its malodorous namesake; for the skunk also does not offend unless he is offended against.

The rough, gargoyle-like flowers of the skunk cabbage appear early, and the leaves, which will stand broad and flat and green all summer long, come on considerably later, when the last of the blossoms is about ready to curl up and die.

Later still, when the autumn frosts have abolished the leaves, you will find the fruits, round, spike-bristling clusters, suggestive of a medieval warrior's mace.

Science News Letter, February 19, 1955

AGRICULTURE

Develop Fast Growing Egg-Laying Broiler

► A CHICKEN, which grows from a chick to a three-pounder in 10 weeks, has been developed by poultrymen at the U. S. Department of Agriculture's Beltsville, Md., research center.

Named the Beltsville broiler, its developers think that it may become as famous as its cousin, the Beltsville Small White turkey.

The result of seven years of experimental breeding, the broiler is a Silver Cornish-New Hampshire cross. Geneticists responsible for the new bird carefully point out, however, that the Beltsville broiler is not a breed.

"It must be produced," the scientists explain, "by mating the new Silver Cornish, also developed at Beltsville, and New Hampshire stock. The best characteristics of these parents are reproduced only in the first generation."

The researchers developed the broiler while searching for a bird that was light in color, which they state is an easier bird to dress, one that feathered out quickly and grew rapidly. They also wanted a bird that would produce a maximum amount of meat in a 10-week period and more eggs annually than most meat-type breeds normally lay.

The scientists also reported in *Agricultural Research* (Feb.) that further work is needed with the breeding, but that the demand for the new broiler is already far greater than the supply. When available, limited numbers of eggs are sold to breeders and distributed to cooperating state experiment stations.

Science News Letter, February 19, 1955

AERONAUTICS

11,400 Miles an Hour Reached in Wind Tunnel

► THE AERODYNAMIC obstacles facing a plane that could fly around the world at low altitudes in a little more than two hours are being studied in a wind tunnel. The 11,400-mile-an-hour speed is believed to be the highest steady simulated wind velocity ever reached in a laboratory.

Scientists at the James Forrestal Research Center of Princeton University, Princeton, N. J., have maintained this gas flow continuously for as long as ten minutes.

The first series of tests with the machine were designed to study the effect of gas friction on simple geometric shapes, including plates, wedges and cones.

In a new approach to the problem of attaining high wind speeds, helium, a light, noninflammable gas, is blown through a test section about four inches in diameter. Thirty-five thousand cubic feet of the gas are kept compressed at 2,500 pounds per square inch to achieve the high velocities.

A vacuum ejector system draws the gas through the tunnel and discharges it into the atmosphere through a silencer.

In later experiments, Prof. Daniel C. Sayre, director of the center, and Drs. Seymour Bogdonoff and Andrew Hammit expect to raise the simulated speeds to the machine's limit of 20 times the speed of sound, or about 15,000 miles an hour.

Science News Letter, February 19, 1955

DO PEOPLE "EXPLODE" IN YOUR OFFICE?

ARE you, as a business executive, a skilled "human chemist"—good at handling your fellow-workers and in getting them to work well with each other? Or do people "explode" in your office—or in their contacts with some of their associates?

In working with people, there is nothing you do which does not involve "human chemistry." Your job is not merely to prevent "explosions," but also to use all the different "human chemicals" which comprise your organization in a manner that will produce the best work, the most profits, and the greatest progress for the business.

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PHYSICS

"Brain" Studies Cancers

► A GIANT electronic "brain" is being put to work in the fight against cancer, three scientists have reported to the American Physical Society in New York.

Using the Los Alamos Scientific Laboratory's computer, the MANIAC, they calculated the beginning time and the period required for tumorous cells' division, assuming that cells split according to the laws of chance.

The size of tumors formed is dependent on the time lag between succeeding cell division in transplantable DBA mouse tumors, Drs. N. Metropolis and V. Gardiner of Los Alamos Scientific Laboratory and Dr. Joseph G. Hoffman of Roswell Park Memorial Institute found.

Other highlights of scientific reports presented to the American Physical Society meeting in New York included:

Certain red giant stars with temperatures of over 100,000,000 degrees Fahrenheit are stoked by the direct conversion of three alpha particles, which are the hearts of helium atoms, into carbon 12, with beryllium as an intermediate step. Dr. E. E. Salpeter of Cornell University, Ithaca, N. Y., reported his calculations for the rate of this reaction, which depends on the temperature and density of the star.

A new, naturally occurring isotope of tantalum, known as Ta 180, has been discovered with the aid of a mass spectrometer by Drs. F. A. White, T. L. Collins and F. M. Rourke of General Electric's Knolls Atomic Power Laboratory.

An electronic computer, the ORACLE, was used at Oak Ridge National Laboratory to analyze the reactions of atomic nuclei after bombardment by Drs. L. C. Biedenharn, now at Rice Institute, and A. Simon.

Dr. S. F. Singer of Maryland University suggested that cosmic rays smashing into the earth's atmosphere from space may result

from the breakup in interstellar space of radiation consisting mostly of iron.

A "meson-generator" is being used to increase by five the number of cosmic ray particles, known as K-mesons, stopped in the stripped photographic emulsions flown at high altitudes to catch tracks of atomic fragments. The emulsions are put inside an iron and paraffin block to get the increase, Drs. N. Seeman, M. M. Shapiro and B. Stillier of the Naval Research Laboratory in Washington reported.

Science News Letter, February 19, 1955

ASTRONOMY

Hoosier Astronomers Discover Asteroid

► A MINOR planet or asteroid, discovered by Hoosier astronomers, is now officially named Indiana in honor of astronomers from Indiana University's Link Observatory in Bloomington, Ind., who first spotted it.

Asteroids are a host of small bodies swarming in paths around the sun between the orbits of Mars and Jupiter. Indiana was first found by Mrs. Beryl Potter, research assistant, on photographic plates made in 1950 by Robert Cameron, then a graduate student.

The asteroid was photographed again in 1953. Two sightings are required before a minor planet is officially discovered. Finders are allowed by custom to name them, and the name Indiana has now been approved by the International Astronomical Union.

Science News Letter, February 19, 1955

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Questions

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ICHTHYOLOGY—What are the sleeping habits of baby fish? p. 120.

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Science News Letter, February 19, 1955

❁ **PORTABLE DEPTH-SOUNDER** can be carried in a rowboat for charting the bottoms of lakes, rivers and shoal waters. Sportsmen, engineers and conservationists can read depths from zero to 240 feet on the chart paper. Weighing only 40 pounds, the electronic depth sounder is powered by a standard six-volt storage battery which will operate for eight hours.

Science News Letter, February 19, 1955

❁ **PUSH-BUTTON PLASTIC** measuring dispenser for homemakers releases a level teaspoonful of sugar, salt or soap powder at the bottom. A gentle tap on the knob releases a few grains, holding the knob down gives a constant flow. An inside stirrer automatically agitates the contents before each release.

Science News Letter, February 19, 1955

❁ **DRESSMAKER'S TAPE** measure combines the advantage of rigid metal and cloth tapes. Folding every seven inches like a



carpenter's rule, the 60-inch yellow woven fabric is bonded with a permanent plastic stiffener. Described as washable, the tape, shown in the photograph, will not curl, stretch, shrink, kink or tangle.

Science News Letter, February 19, 1955

❁ **SEA SHELL** costume jewelry kit for the do-it-yourself enthusiast provides varied colored natural shells along with sturdy findings. Three different kits contain four, eight and 11 jewelry projects from which women and children can make their own pins, bracelets and earrings.

Science News Letter, February 19, 1955

❁ **POCKET OILER**, made of plastic, clips to your pocket like a fountain pen. For use, the lower end of the barrel is unscrewed and the button on the top pressed to release the desired amount of oil. It is designed so there is no danger of leakage.

Science News Letter, February 19, 1955

❁ **LAWN CUTTER** has a handle mounting which can be easily adjusted to the height of any operator. Available in 11 models, with cutting widths from 16 inches to 22 inches, the new power mowers also have the drive assembly completely enclosed.

Science News Letter, February 19, 1955

❁ **INTERCHANGEABLE TOP** frames for eyeglasses snap on or off easily. Designed for milady, the top trims come in two different styles and ten selected colors. A complete set can be obtained in a jewel-box case, offering glass frame harmony with a change of costume.

Science News Letter, February 19, 1955

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Do You Know?

There are now approximately 9,200 air markers in the United States; 2,290 of these roof-top or tower-top signs with 10-foot chrome yellow letters and an arrow pointing the way to the nearest airport have been erected in the past 12 months.

The exposure to radiation by nearly 4,000 radiologists did not cause any new or unusual kinds of abnormalities in their children, a nationwide survey showed.

The 64,875 aircraft in the United States owned by individuals and businesses other than airlines exceed the total number of airplanes registered in the rest of the world.

The male bird is generally inconspicuously colored like the female if he helps with brooding the eggs; if he is brilliantly colored he stays away from the nest.

Plants store iron in the parts being formed when they absorb the element.

The female praying mantis eats her mate after their honeymoon.